Data Record on Vegetation and Insect Sampling in the Marine Riparian Zone of Furry Creek and Porteau Cove, Howe Sound, British Columbia

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DATA RECORD ON VEGETATION AND INSECT SAMPLING IN THE MARINE RIPARIAN ZONE OF FURRY CREEK AND PORTEAU COVE, HOWE SOUND, BRITISH COLUMBIA

by

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ABSTRACT

Piercey, G.E., C.D. Levings, and C. Durance. 2004. Data record on vegetation and insect sampling in the marine riparian zone of Furry Creek and Porteau Cove, Howe Sound, British Columbia. Can. Data Rep. Fish. Aquat. Sci. 1133: 23 p.

Data are presented on the marine riparian areas of Furry Creek and Porteau Cove, Howe Sound, British Columbia as a preliminary assessment on the possible sources of organic input to the nearshore juvenile salmonid food web. The study occurred between February and March 2001. Three locations were established: Furry Creek North, Furry Creek South (north and south of the creek mouth respectively) and Porteau Cove (within the Porteau Cove Provincial Campsite boundary). Five invertebrate traps were positioned at each location and were assessed for terrestrial and aquatic invertebrate accumulation. A qualitative assessment of vegetation within a 5 m radius of each invertebrate trap, and within an area of 100 m^2 at each location was done. In addition, adjacent backshore areas were also qualitatively assessed.

RESUME

Piercey, G.E., C.D. Levings, C. Durance. 2004. Data record on vegetation and insect sampling in the marine riparian zone of Furry Creek and Porteau Cove, Howe Sound, British Columbia. Can. Data Rep. Fish. Aquat. Sci. 1133: 23 p.

Nous présentons des données sur la zone riveraine du littoral marin du crique Furry et de l'anse Porteau, dans la baie Howe (Colombie-Britannique). Il s'agit d'une évaluation préliminaire des sources possibles d'apports de matière organique dans le réseau trophique littoral des salmonidés juvéniles. L'étude a été réalisée entre février et mars 2001. Trois stations ont été établies : Furry Creek Nord, Furry Creek Sud (respectivement nord et sud de l'embouchure du crique) et Porteau Cove (dans les limites du terrain de camping provincial Porteau Cove). Cinq pièges à invertébrés ont été installés à chaque station, et nous avons évalué l'accumulation d'invertébrés terrestres et aquatiques. Dans un rayon de 5 m de chaque piège, nous avons effectué une évaluation qualitative de la végétation, de même que sur une superficie de 100 m^2 à chaque emplacement. De plus, nous avons réalisé une évaluation qualitative des arrière-plages.

INTRODUCTION

At the present time there is little information on the importance of the "marine riparian zone", that area shoreward of the high tide or drift line (more accurately described as the supralittoral zone) to the food web ecology of the nearshore environment (Levings and Jamieson 2001). Without such information, habitat managers cannot accurately assess the sensitivity of these areas with respect to development such as forestry and urban encroachment. Juvenile chum and pink are known to utilize the nearshore environment during their migration through Howe Sound (Grout et al. 1999); juvenile chinook and coho have also been found in these nearshore, intertidal areas (Grout et al. 1998). In Puget Sound surf smelt (*Hypomesus pretious*) and sand lance (*Ammodytes hexapterus*) utilize sand and gravel substrate near high tide for spawning and/or incubation (Penttila 1997).

This report is a preliminary assessment and data record of the Furry Creek and Porteau Cove areas of Howe Sound with respect to potential sources of fish food organisms and associated vegetation. The study was conducted between February and March 2001.

METHODS

Locations

Three locations were established, two around Furry Creek (north of the Creek (FCN) and south of the creek (FCS)), and Porteau Cove (PC). See Figures 1 and 2.

Furry Creek North: This is a recently-developed residential area. The shoreline has been armoured with rip-rap and is devoid of any overhanging vegetation. There is a narrow strip (approximately 3 meters width) of landscape plants.

Furry Creek South: At the time of this study this location was characterized by a mature coniferous backshore of approximately 25 m.

Porteau Cove: This location is within the Porteau Provincial Park and is just south of the cove itself. Most of the backshore has been removed to provide campsites for the campsite. There is a narrow strip (approximately 5 m) of overhanging shrubs and mature trees in the backshore.

Invertebrate Survey

The invertebrate survey portion of the study was conducted between February and March 2001. One trial was discarded due to heavy rain during the 24-h deployment. Five invertebrate traps, measuring 21.5 cm width, 33.5 cm length and 9 cm depth, were deployed approximately 50 m apart at each of the three locations. They were positioned at the high tide line, as demarcated by driftwood and wrack. Table 1 lists the geo-referenced locations (UTM, NAD-83) for each trap. The traps were dug into the substrate (FCS and PC), or surrounded by rocks (FCN) so that the top edge was flush with the surface, a soap (non-scented)/water mixture was added to a depth of approximately 0.5 cm.

After a deployment period of approximately 24 hours, the traps were retrieved, and returned to the laboratory. Each sample was sieved through 250 μ mesh to remove the soap/water mixture; the sample was then preserved in 10% formalin. After a period of fixation, the formalin was rinsed out, and the samples were identified, and then preserved in 70% isopropanol. Taxa abbreviations (codes) are given in Table 2, and results are listed in Table 3.

Vegetation Survey

A qualitative assessment of the backshore vegetation for each location was undertaken during the period of study. Common and scientific names of all vegetation identified from the three locations are given in Table 4.

In mid-March at each invertebrate trap site a listing was made of plant species found within a 5 m radius. Results are listed in Table 5. Percent cover of vegetation was assessed in a 100 m^2 area around each invertebrate trap (5 m parallel to the shore in each direction and 10 m inshore from the high tide line. Results are given in Table 6.

In addition to the two above assessments, an additional analysis of vegetation "adjacent" to the two locations was undertaken. The vegetated areas of Furry Creek South and Porteau Cove were assessed at 11,671 and 14,188 m^2 respectively, from interpretation of 1999 colour orthophotos of 1994 photos. These adjacent forested areas were examined qualitatively for determination of species (Table 7). Prior to the development at Furry Creek South, in 1999 the vegetated area was estimated to be 43,140 m^2.

ACKNOWLEDGEMENTS

Thanks are due to Perry Poon, who identified the contents of the invertebrate traps and to the Porteau Cove Provincial Campsite staff for access. This study was funded by the National Department of Fisheries and Oceans Habitat management program and the Science Branch, Pacific Region.

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Table 1. Geo-referenced site locations of invertebrate traps at Furry Creek North (FCN), Furry Creek South (FCS) and Porteau Cove (PC).

SITE	UTM (NAD-83, ZONE 10) EASTING	NORTHING
FCS-1	483531	5491899
FCS-2	483539	5491960
FCS-3	483544	5492059
FCS-4	483531	5492131
FCS-5	483567	5492205
FCN-6	483703	5492493
FCN-7	483737	5492532
FCN-8	483747	5492563
FCN-9	483763	5492612
FCN-10	483831	5492659
PC-1	483021	5489304
PC-2	482963	5489260
PC-3	482933	5489215
PC-4	482940	5489175
PC-5	482965	5489130

Table 2. Identification codes for invertebrate trap catches. * indicates unknown life stage as instars and adults are morphologically similar.

CODE	ORDER	FAMILY	STAGE
ACAR	Acari		Adult
APHI	Homoptera	Aphididae	Adult
ARAN	Araneae		Adult
CANA	Diptera	Canaceidae	Adult
CERA	Diptera	Ceratopogonidae	Adult
CHIA	Diptera	Chironomidae	Adult
CHIL	Diptera	Chironomidae	Larvae
CICA	Homoptera	Cicadellidae	Adult
DIPL	Diplopoda		Adult
EMPI	Diptera	Empididae	Adult
ENTO	Collembola	Entomobryidae	*
HEBR	Hemiptera	Hebridae	Adult
HYPO	Collembola	Hypogastruridae	*
ICHN	Hymenoptera	Ichneumonidae	Adult
LIGI	Isopoda	Ligiidae	Adult
MUSC	Diptera	Muscidae	Adult
MYMA	Hymenoptera	Mymaridae	Adult
OPIL	Opiliones		Adult
SCIO	Diptera	Sciomyzidae	Adult
SMIN	Collembola	Sminthuridae	*
STPA	Coleoptera	Staphylinidae	Adult
STPL	Coleoptera	Staphylinidae	Larvae
TALI	Amphipoda	Talitridae	Adult
THYS	Thysanoptera		Adult
TING	Hemiptera	Tingidae	Adult
TIPU	Diptera	Tipulidae	Adult

Table 3. Invertebrate trap catches for Furry Creek North (FCN), Furry Creek South (FCS) and Porteau Cove (PC). Results are number per trap, per 24-h deployment. Refer to Table 2 for identification codes.

DATE	SITE	ENTO	HYPO	SMIN	CANA	CERA	CHIL	CHIA	EMPI	MUSC	SCIO	TIPU	DIPL	ACAR
14-Feb-01	FCS-1	94	29	0	0	0	0	56	0	0	0	0	0	3
14-Feb-01	FCS-2	43	364	1	0	0	0	0	0	0	0	0	0	0
14-Feb-01	FCS-3	63	763	0	0	0	0	51	0	0	0	0	0	1
14-Feb-01	FCS-4	220	157	0	1	0	0	48	0	0	0	0	0	0
14-Feb-01	FCS-5	413	152	0	0	0	0	32	0	0	0	0	0	2
14-Feb-01	FCN-6	4	0	0	1	0	0	33	0	0	0	0	0	0
14-Feb-01	FCN-7	0	0	0	2	0	0	14	0	0	0	0	0	0
14-Feb-01	FCN-8	0	0	0	0	0	0	22	0	0	0	0	0	0
14-Feb-01	FCN-9	2	0	0	1	0	0	33	0	0	0	0	0	0
14-Feb-01	FCN-10	0	0	0	4	0	0	14	0	0	0	0	0	0
27-Feb-01	FCS-1	0	0	0	0	0	0	4	0	0	0	0	0	0
27-Feb-01	FCS-2	8	7	1	0	0	0	27	0	0	0	0	0	0
27-Feb-01	FCS-3	8	45	0	3	2	0	94	0	0	0	0	0	4
27-Feb-01	FCS-4	7	7	0	0	0	0	28	0	0	0	0	0	0
27-Feb-01	FCS-5	8	18	0	0	0	0	21	0	0	0	0	0	0
27-Feb-01	FCN-6	0	0	0	0	0	0	18	0	0	0	0	0	0
27-Feb-01	FCN-7	2	0	0	0	0	0	12	0	0	0	0	0	0
27-Feb-01	FCN-8	4	0	0	0	0	0	8	0	0	0	0	0	0
27-Feb-01	FCN-9	2	1	0	1	0	0	25	0	0	0	0	0	0
27-Feb-01	FCN-10	1	0	0	1	0	0	5	0	0	0	0	0	0
14-Mar-01	FCS-1	5	5	4	1	0	0	8	0	0	0	0	0	3
14-Mar-01	FCS-2	7	2	3	1	2	0	7	0	0	0	0	1	3
14-Mar-01	FCS-3	1	5	1	0	0	0	8	0	0	0	0	0	1
14-Mar-01	FCS-4	28	4	6	0	1	0	10	0	0	0	0	0	0
14-Mar-01	FCS-5	7	1	4	0	0	0	10	0	0	0	0	0	4
14-Mar-01	FCN-6	3	0	0	1	0	0	17	0	0	0	0	0	0
14-Mar-01	FCN-7	3	0	1	0	0	0	3	0	0	0	0	0	0
14-Mar-01	FCN-8	22	0	0	0	0	0	9	0	0	0	0	0	1
14-Mar-01	FCN-9	4	1	0	0	0	0	11	0	0	0	0	0	0
14-Mar-01	FCN-10	0	0	0	1	0	0	4	0	1	0	0	0	0

Table 3 (continued)

ARAN	OPIL	LIGI	TALI	APHI	CICA	HEBR	TING	STPL	STPA	THYS	ICHN	MYMA
0	0	0	3	1	1	0	0	0	0	0	0	0
0	0	0	33	0	0	1	0	0	0	0	0	0
0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	19	2	1	0	0	0	0	0	0	0
0	0	0	27	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	12	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0
1	0	0	4	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1	0	0	0	0	0
0	0	0	7	0	0	0	0	0	0	0	0	0
0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	3	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	29	0	0	0	0	0	0	0	0	0
2	0	1	67	0	0	0	0	0	0	0	0	0
4	0	0	96	2	0	0	0	0	0	0	0	0
3	0	2	1	0	0	0	0	0	0	0	0	0
4	0	0	67	2	1	0	0	0	0	0	0	0
0	0	0	5	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	8	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	0	0	0	0	1	0

Table 3 (continued)

DATE	SITE	ENTO	HYPO	SMIN	CANA	CERA	CHIL	CHIA	EMPI	MUSC	SCIO	TIPU	DIPL
27-Mar-01	FCS-1	4	48	15	0	1	0	12	0	0	0	0	0
27-Mar-01	FCS-2	3	45	1	2	1	0	44	0	0	0	0	0
27-Mar-01	FCS-3	2	15	6	1	2	0	12	0	0	0	0	0
27-Mar-01	FCS-4	7	7	1	2	2	0	23	2	0	1	0	0
27-Mar-01	FCS-5	1	17	7	0	0	0	31	0	0	0	0	0
27-Mar-01	FCN-6	2	1	0	0	0	0	5	0	0	0	0	0
27-Mar-01	FCN-7	0	0	0	0	0	0	7	0	0	0	0	0
27-Mar-01	FCN-8	19	2	1	0	1	0	14	0	0	0	0	0
27-Mar-01	FCN-9	1	0	0	0	0	0	23	0	0	0	0	0
27-Mar-01	FCN-10	0	0	0	0	0	0	13	0	0	0	0	0
2-Mar-01	PC-1	1469	60	0	0	0	0	38	0	0	0	2	0
2-Mar-01	PC-2	592	8	0	0	2	3	66	0	0	0	0	0
2-Mar-01	PC-3	912	2	1	2	0	0	26	0	0	1	0	0
2-Mar-01	PC-4	480	3	0	0	0	0	20	0	0	0	0	0
2-Mar-01	PC-5	1002	1	1	0	0	1	27	0	0	0	0	0
27-Mar-01	PC-1	6	4	1	0	0	0	13	1	0	0	0	0
27-Mar-01	PC-2	9	1	1	0	2	0	0	2	0	0	1	0
27-Mar-01	PC-3	1	0	3	0	0	0	16	0	0	0	0	4
27-Mar-01	PC-4	30	0	1	0	0	0	49	0	0	0	0	0
27-Mar-01	PC-5	10	1	6	0	0	0	76	0	0	0	0	0

Table 3 (continued)

ACAR	ARAN	OPIL	LIGI	TALI	APHI	CICA	HEBR	TING	STPL	STPA	THYS	ICHN	MYMA
9	1	0	0	5	2	1	0	0	0	0	0	0	0
0	2	0	0	19	2	0	0	0	1	1	0	0	0
5	2	1	0	16	3	1	0	0	1	0	0	0	0
1	1	0	1	1	0	0	0	0	0	0	0	0	1
2	1	0	0	10	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	3
7	0	0	31	310	0	0	0	0	0	0	0	0	0
5	0	0	209	436	0	0	0	0	0	0	0	0	0
2	0	0	5	318	0	0	0	0	0	0	0	0	0
8	0	0	0	839	0	1	0	0	0	0	0	0	0
19	0	0	0	732	0	0	0	0	0	0	0	0	0
1	0	0	1	2	0	0	0	0	0	0	0	0	1
2	1	0	0	5	0	0	0	0	0	1	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1
3	0	1	0	98	0	1	0	0	0	0	1	0	0
0	0	0	0	80	0	0	0	0	0	0	0	0	0

Table 4. Common and scientific names of vegetation identified at Furry Creek North, Furry Creek South, and Porteau Cove. * indicates a non-indigenous species.

Type	Common Name	Scientific Nomenclature
Trees	big leaf maple	Acer macrophyllum
	cherry	Prunus sp.*
	Douglas-fir	Pseudotsuga menziesii ssp. menziesii
	red alder	Alnus rubra
	Sitka spruce	Picea sitchensis
	western hemlock	Tsuga heterophylla
	western red cedar	Thuja plicata
Shrubs	big leaf maple	Acer macrophyllum
	black twinberry	Lonicera involucrata
	cherry	Prunus sp.*
	Douglas-fir	Pseudotsuga menziesii ssp. menziesii
	dull Oregon-grape	Mahonia nervosa
	English ivy	Hedera sp.*
	Himalayan blackberry	Rubus discolor*
	holly	Ilex sp.*
	honeysuckle	Lonicera sp.
	Indian plum	Oemleria cerasiformas
	lilac	Syringa sp.*
	oceanspray	Holodiscus discolor
	oval-leaved blueberry	Vaccinium ovalifolium
	oval-leaved huckleberry	Vaccinium ovalifolium
	red alder	Alnus rubra
	red elderberry	Sambucus racemosa ssp. pubens
	red huckleberry	Vaccinium parvifolium
	red-flowering currant	Ribes sanguineum
	rhodendron	Rhodendron sp.
	rose	Rosa sp.
	salal	Gaultheria shallon
	salmonberry	Rubus spectabilis
	Sitka spruce	Picea sitchensis
	Sitka willow	Salix sitchensis.
	snowberry	Symphoricarpos albus
	trailing blackberry	Rubus ursinus
	western hemlock	Tsuga heterophylla
	western red cedar	Thuja plicata

Table 4 (continued)

Type	Common Name	Scientific Nomenclature
Herbaceous Plants	beach pea	Lathyrus japonicus
	bog candle	Platanthera dilata
	bracken fern	Pteridium aquilinum
	bulrush	Scirpus sp.
	cleavers	Galium aparine
	common dandelion	Taraxacum officinale
	common foxglove	Digitalis purpurea
	creeping buttercup	Ranunculus repens*
	curled dock	Rumex crispus
	dunegrass	Elymus mollis
	false lily-of-the-valley	Maianthemum dilatatum
	foamflower	cf. Tiarella trifoliata
	grass	European Species*
	hairy cat's-ear	Hypochaeris radicata*
	herb-Robert	Geranium robertianum
	lady fern	Athyrium filix-femina
	large-leaved avens	Geum macrophyllum
	licorice fern	Polypodium glycyrrhiza
	Pacific bleeding heart	Dicentra Formosa
	pearly everlasting	Anaphalis margaritacea
	spiny wood fern	Dryopteris expansa
	St. John's-wort	Hypericum sp.
	sword fern	Polystichum munitum
	wall lettuce	Lactuca muralis*

Table 5. Vegetation identified within a 5 m radius of invertebrate traps at Furry Creek North (FCN), Furry Creek South (FCS), and Porteau Cove (PC). Refer to Table 4 for scientific nomenclature.

Site	Trees	Shrubs	Herbaceous	Moss/Lichen
FCS-1	Sitka spruce western red cedar	oval-leaved huckleberry red alder red huckleberry rose salal trailing blackberry western hemlock western red cedar	beach pea dunegrass wall lettuce	none
FCS-2	Sitka spruce western red cedar	Douglas-fir red alder red huckleberry rose salal salmonberry western hemlock western red cedar	beach pea	sparse
FCS-3	Sitka spruce	Douglas-fir oval-leaved blueberry red alder red huckleberry salal salmonberry western hemlock western red cedar	none	common
FCS-4	none	red alder salal trailing blackberry western hemlock western red cedar	beach pea dunegrass hairy cat's-ear	present on logs
FCS-5	Sitka spruce western red cedar Douglas-fir western hemlock	red alder salal western hemlock western red cedar	beach pea grass wall lettuce	sparse

Table 5 (continued)

Site	Trees	Shrubs	Herbaceous	Moss/Lichen
PC-1	none	rose salmonberry Sitka willow snowberry	none	none
PC-2	Douglas-fir	oval-leaved blueberry red huckleberry rose salal western red cedar	herb-Robert	none
PC-3	Douglas-fir western red cedar cherry	oceanspray rose salal snowberry	none	none
PC-4	big-leaf maple Western red cedar	English ivy oceanspray rose salal snowberry	none	none
PC-5	none	cherry oceanspray rose salal snowberry trailing blackberry	none	none

Table 6. Percent cover of vegetation in an area of 100 m^2 at each invertebrate trap location at Furry Creek North (FCN), Furry Creek South (FCS) and Porteau Cove (PC). Refer to Table 4 for scientific nomenclature. LOD indicates large organic debris.

Site	Groundcover	Common Name	% Cover	Notes
FCS-1	Beach	LOD	20	
		sand	5	
		beach pea	<5	
		dunegrass	5	
	Land (herbaceous)	wall lettuce	<5	
	Overstory (trees)	Sitka spruce	80	
		western red cedar	15	
	Understory (shrubs)	oval-leaved huckleberry	<5	
		red alder	<5	
		red huckleberry	<5	
		rose	<5	
		salal	10	
		salmonberry	5	
		trailing blackberry	<5	
		western hemlock	10	
		western red cedar	10	
FCS-2	Beach	LOD	15	
		sand & gravel	5	
		beach pea	<5	
	Land (herbaceous)	various species	30	
	Overstory (trees)	red alder	5	
		Sitka spruce	25	
		western red cedar	40	

Table 6 (continued)

Site	Groundcover	Common Name	% Cover	Notes
	Understory (shrubs)	black twinberry	<5	
		Douglas-fir	<5	
		red alder	30	
		red huckleberry	<5	
		rose	<5	
		salal	10	
		salmonberry	<5	
		Sitka spruce	10	
		western hemlock	<5	
		western red cedar	10	
FCS-3	Beach	LOD	5	
		sand & gravel	5	
	Land (herbaceous)	beach pea	<5	
		dunegrass	5	
		false lily-of –the-valley	5	
	Overstory (trees)	Douglas-fir	10	
		Sitka spruce	80	
		western red cedar	5	
	Understory (shrubs)	Douglas-fir	<5	
		oval-leaved blueberry	<5	
		red alder	<5	
		red huckleberry	<5	
		salal	<5	
		salmonberry	<5	
		western hemlock	<5	
		western red cedar	<5	
FCS-4	Beach	LOD	10	
		sand & gravel	<5	
	Land (herbaceous)	beach pea	<5	
		dunegrass	<5	
		false lily-of –the-valley	<5	
		hairy cat's-ear	<5	
		pearly everlasting	<5	
		wall lettuce	<5	

Table 6 (continued)

Site	Groundcover	Common Name	% Cover	Notes
	Overstory (trees)	red alder	25	
		Sitka spruce	70	
	Understory (shrubs)	Douglas-fir	<5	
		Indian-plum	<5	
		oceanspray	<5	
		oval-leaved blueberry	<5	
		red alder	<5	
		red huckleberry	<5	
		salal	<5	
		salmonberry	5	
		western hemlock	5	
		western red cedar	5	
		red-flowering currant	<5	
FCS-5	Beach	LOD	20	
		sand & gravel	<5	
	Land (herbaceous)	beach pea	<5	
		dunegrass	<5	
		false lily-of –the-valley	<5	
		grass	20	
		hairy cat's-ear	<5	
		pearly everlasting	<5	
		wall lettuce	<5	
	Overstory (trees)	Douglas-fir	10	
		Sitka spruce	70	
		western hemlock	<5	
		western red cedar	5	
	Understory (shrubs)	red alder	5	
		rose	<5	
		salal	<5	
		western hemlock	5	
		western red cedar	5	
FCN-6	Beach	cobble	65	
		LOD	10	logs

Table 6 (continued)

Site	Groundcover	Common Name	% Cover	Notes
	Upland	LOD	5	landscaping logs
		hogfuel and soil	10	garden with small shrubs (<5%)
		asphalt	10	walkway
FCN-7	Beach	cobble	50	
		LOD	<5	logs
	Upland	LOD	5	landscaping logs
		hogfuel and soil	20	garden with small shrubs (<5%)
		asphalt	25	walkway
FCN-8	Beach	cobble	45	
		LOD	5	logs
	Upland	LOD	5	landscaping logs
		hogfuel and soil	20	garden with small shrubs (<5%)
		asphalt	25	walkway
FCN-9	Beach	cobble and rock	50	
		LOD	<5	logs
	Upland	LOD	5	landscaping logs
		hogfuel and soil	20	garden with small shrubs (<5%)
		asphalt	25	walkway
FCN-10	Beach	cobble and rock	50	
		LOD	<5	logs
	Upland	LOD	5	landscaping logs
		hogfuel and soil	20	garden with small shrubs (<5%)
		asphalt	25	walkway
PC-1	Beach	LOD	20	
		sand & gravel	10	
	Land (herbaceous)	gravel (campsite)	60	
		false lily-of-the-valley	<5	
		sword fern	<5	

Table 6 (continued)

Site	Groundcover	Common Name	% Cover	Notes
	(tall shrubs)	red alder	5	
		Sitka willow	10	
		western red cedar	5	
	Understory (low shrubs)	rose	<5	
		salal	<5	
		salmonberry	10	
		snowberry	10	
PC-2	Beach	LOD	10	
		sand & gravel	20	
	land (herbaceous)	gravel (campsite)	55	
		false lily-of-the-valley	<5	
		herb-Robert	<5	
	Overstory (trees)	Douglas-fir	50	
	Understory (low shrubs)	oceanspray	5	
		oval-leaved blueberry	<5	
		red alder	<5	
		red huckleberry	<5	
		rose	<5	
		salal	<5	
		western red cedar	<5	
PC-3	Beach	LOD	10	
		gravel with sand	20	
	land (herbaceous)	gravel (campsite)	30	
		grass lawn	10	
	Overstory (trees)	cherry	<5	
		Douglas-fir	20	
		western red cedar	10	
	Understory (low shrubs)	oceanspray	<5	
		red alder	5	
		rose	20	
		salal	5	
		snowberry	<5	

Table 6 (continued)

Site	Groundcover	Common Name	% Cover	Notes
PC-4	Beach	LOD	10	
		sand & gravel	20	
	Land (herbaceous)	gravel (campsite)	55	
	Overstory (trees)	big-leaf maple	5	
		western red cedar	5	
	Understory (low shrubs)	English ivy	<5	
		oceanspray	5	
		rose	10	
		salal	<5	
		snowberry	<5	
PC-5	Beach	LOD	10	
		sand & gravel	10	
	Land (herbaceous)	gravel (campsite)	60	
	Overstory (tall shrubs)	cherry	5	
	Understory (low shrubs)	oceanspray	10	
		rose	5	
		salal	<5	
		snowberry	5	
		trailing blackberry	<5	

Table 7. Vegetation identified within forested areas adjacent to sampling locations at Furry Creek South (FCS) and Porteau Cove (PC). Polygons are depicted in Figures 1 and 2. Refer to Table 4 for scientific nomenclature.

SITE	TYPE	COMMON NAME
FCS	Trees	big leaf maple
		Douglas-fir
		Sitka spruce
		western hemlock
		western red cedar
	Shrubs	black twinberry
		dull Oregon-grape
		holly
		Indian plum
		oval-leaved blueberry
		red alder
		red elderberry
		red huckleberry
		red-flowering currant
		rose
		salal
		salmonberry
		trailing blackberry
	Herbaceous	beach pea
		bog candle
		bracken fern
		bulrush
		cleavers
		creeping buttercup
		curled dock
		dunegrass
		false lily-of-the-valley
		foamflower
		grass
		hairy cat's-ear
		lady fern
		large-leaved avens
		licorice fern
		pearly everlasting
		spiny wood fern
		St. John's-wort

Table 7 (continued)

SITE	TYPE	COMMON NAME
		sword fern
		wall lettuce
PC	Trees	big-leaf maple
		Douglas-fir
		Sitka spruce
		western red cedar
	Shrubs	big-leaf maple
		cherry
		dull Oregon-grape
		English ivy
		Himilayan blackberry
		honeysuckle
		lilac
		oceanspray
		oval-leaved blueberry
		red alder
		red elderberry
		red huckleberry
		red-flowering currant
		rhodendron
		rose
		salal
		salmonberry
		Sitka willow
		snowberry
		thimbleberry
		trailing blackberry
	Herbaceous	common dandelion
		common foxglove
		creeping buttercup
		false lily-of-the-valley
		grass
		hairy cat's-ear
		herb-Robert
		large-leaved avens
		licorice fern
		Pacific bleeding heart
		sword fern
		wall lettuce

Figure 1. Furry Creek overview, showing invertebrate trap locations.

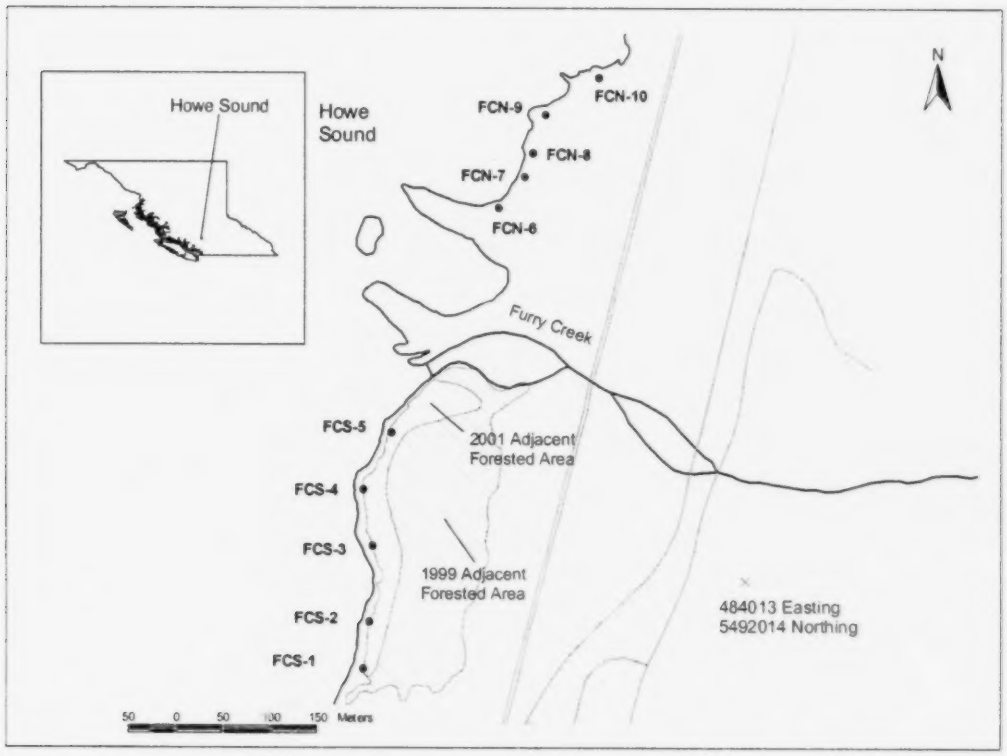

Figure 2. Porteau Cove overview showing invertebrate trap locations.